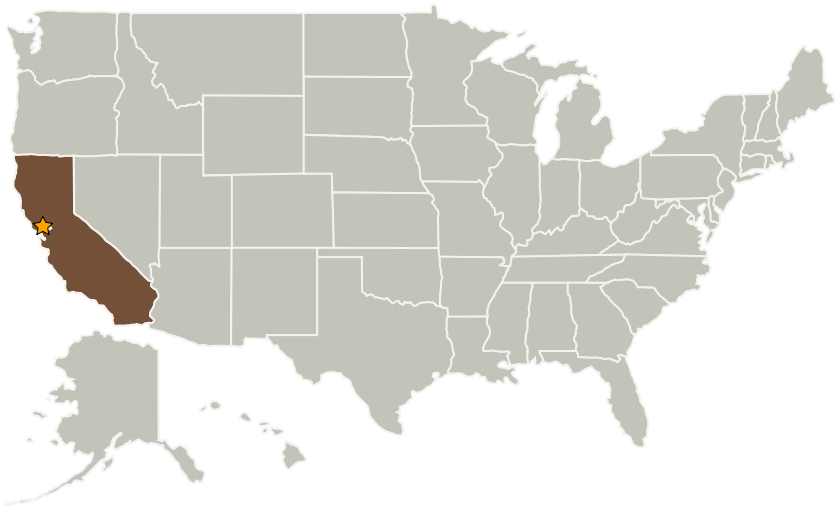
# Plug-and-Play Star Sensor for Rapid Spacecraft Integration, Phase I

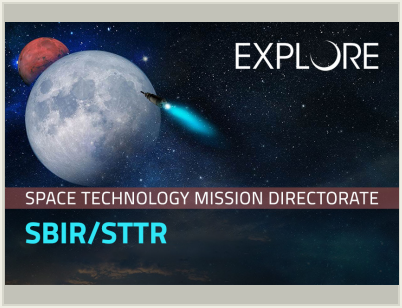
Completed Technology Project (2008 - 2008)

## Project Introduction

Microcosm, with Space Micro., and HRP Systems will design a plug-and-play (PnP) star sensor for small satellites. All three companies are well experienced in developing PnP systems for the U. S. Air Force during the past 6 years. On an existing Phase II Air Force SBIR program, Microcosm built a prototype star sensor called MicroMak. The sensor proposed here will focus on PnP compatibility for NASA missions of interest. The PnP star sensor recurring cost target is $150 K to $200 K, with a mass between 0.5 and 1 kg. Expected NASA mission applications necessitate a modified version of the baseline MicroMak sensor, including: 1) Interfaces compatible with a new PnP avionics architecture, 2) radiation-hardened focal plane arrays (FPAs) and processing electronics to enable longer mission life. The baseline MicroMak sensor was designed with inherent radiation-tolerant features: complimentary metal oxide semiconductor (CMOS) FPAs with no direct space view, and all-reflective optical elements. The new PnP star sensor will build on MicroMak heritage and provide a modular, PnP-compatible, long-life star sensor for NASA missions, at low cost compared with traditional star sensors. A cost and mass reduction of a factor of 2 or more over traditional sensors is expected.

## Primary U.S. Work Locations and Key Partners



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## Organizational Responsibility

**Responsible Mission Directorate:**

Space Technology Mission Directorate (STMD)

**Lead Center / Facility:**

Ames Research Center (ARC)

**Responsible Program:**

Small Business Innovation Research/Small Business Tech Transfer

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| Organizations Performing Work | Role | Type | Location |
|---|---|---|---|
| ★Ames Research Center(ARC) | Lead Organization | NASA Center | Moffett Field, California |
| Microcosm, Inc. | Supporting Organization | Industry<br>Women-Owned Small Business (WOSB) | Hawthorne, California |

| Primary U.S. Work Locations |
|---|
| California |

## Project Management

**Program Director:**

Jason L Kessler

**Program Manager:**

Carlos Torrez

**Principal Investigator:**

James Wertz

## Technology Areas

**Primary:**

- TX17 Guidance, Navigation, and Control (GN&C)
  - TX17.4 Attitude Estimation Technologies
    - TX17.4.3 Attitude Estimation Sensors